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What is Claimed:

- 1 1. A method of generating a dithered laser light with substantially
2 constant amplitude in a system including a laser and a semiconductor optical amplifier
3 (SOA), comprising the steps of:
 - 4 a) amplitude modulating a laser drive current of the laser to generate a
5 modulated laser light with optical linewidth dithering;
 - 6 b) coupling the modulated laser light into the SOA; and
 - 7 c) modulating an SOA drive current of the SOA approximately 180° out
8 of phase with the laser drive current to generate the dithered laser light with substantially
9 constant amplitude.
- 1 2. The method according to claim 1 wherein step (c) includes the steps
2 of:
 - 3 c1) setting a phase of a modulation of the SOA drive current 180° out of
4 phase with the laser drive current;
 - 5 c2) detecting an amplitude of the dithered laser light; and
 - 6 c3) adjusting in phase at least one of the modulation of the laser drive
7 current and the modulation of the SOA drive current until an amplitude of the dithered
8 laser light is substantially constant.
- 1 3. An optical source to provide substantially constant amplitude,
2 dithered laser light, comprising;
 - 3 a laser source;
 - 4 a semiconductor optical amplifier (SOA) optically coupled to the laser
5 source;

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6 a current modulator electrically coupled to the laser source to provide a first
7 modulated drive current to the laser source; and

8 a phase shifter electrically coupled to the current modulator and to the SOA,
9 the phase shifter shifting a first modulated drive current phase of the first modulated drive
10 current to create a second modulated drive current, and the phase shifter providing the
11 second modulated drive current to the SOA.

1 4. The optical source according to claim 3, wherein the phase shifter
2 inverts the first modulated drive current in phase to generate the second modulated drive
3 current.

1 5. The optical source according to claim 3, wherein the phase shifter
2 shifts the first modulated drive current phase of the first modulated drive current
3 approximately 180° to create the second modulated drive current.

1 6. The optical source according to claim 3, wherein the laser source and
2 the SOA are monolithically integrated.

1 7. The optical source according to claim 3, wherein the phase shifter
2 amplifies the second modulated drive current before providing the second modulated drive
3 current to the SOA.

1 8. The optical source according to claim 3, wherein the phase shifter
2 attenuates the second modulated drive current before providing the second modulated
3 drive current to the SOA.

1 9. The optical source according to claim 3, further comprising an
2 electroabsorption modulator (EAM) optically coupled to the SOA.

1 10. The optical source according to claim 9, wherein the EAM and the
2 SOA are monolithically integrated.

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1 11. A method of generating a dithered laser light with substantially
2 constant amplitude in a system including a laser and a variable optical attenuator (VOA),
3 comprising the steps of:

4 a) modulating a laser drive current of the laser to generate a modulated
5 laser light with optical linewidth dithering;

6 b) coupling the modulated laser light into the VOA; and

7 c) modulating a VOA drive current of the VOA approximately in phase
8 with the laser drive current to generate the dithered laser light with substantially constant
9 amplitude.

1 12. The method according to claim 11 wherein step (c) includes the steps
2 of:

3 c1) setting a phase of a modulation of the VOA drive current in phase
4 with the laser drive current;

5 c2) detecting an amplitude of the dithered laser light; and

6 c3) adjusting at least one of the phase and an amplitude of the
7 modulation of the VOA drive current until an amplitude of the dithered laser light is
8 substantially constant.

1 13. An optical source to provide substantially constant amplitude,
2 dithered laser light, comprising;

3 a laser source;

4 a variable optical attenuator (VOA) optically coupled to the laser source; and

5 a current modulator electrically coupled to the laser source and the VOA to
6 provide a drive current modulation to the laser source and the VOA.

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1 14. The optical source according to claim 13, wherein the current
2 modulator amplifies the drive current modulation before providing the drive current
3 modulation to the laser source.

1 15. The optical source according to claim 13, wherein the current
2 modulator amplifies the drive current modulation before providing the drive current
3 modulation to the VOA.

1 16. An optical transmitter which uses substantially constant amplitude,
2 dithered laser light, comprising;

3 a laser source;

4 an electroabsorption modulator (EAM) optically coupled to the laser source;

5 a current modulator electrically coupled to the laser source and the EAM to
6 provide a drive current modulation having a first frequency to the laser source and the
7 EAM; and

8 a signal generator electrically coupled to the EAM to provide a signal
9 modulation for modulating an optical signal of the optical transmitter at a second
10 frequency significantly greater than the first frequency.